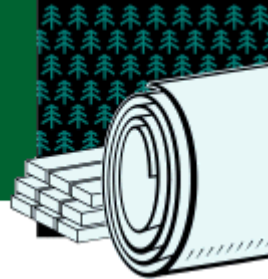


FOREST PRODUCTS

Project Fact Sheet



SYNTHESIS, CHARACTERIZATION, AND APPLICATION OF WATER-SOLUBLE AND EASILY REMOVABLE PRESSURE SENSITIVE ADHESIVES

BENEFITS

- Decrease in capital costs
- Water solubility of the adhesives
- Cost savings of \$600 million annually to industry
- Environmental benefits from eliminating solid waste and improving paper-recycling operations
- Reduction in energy use

APPLICATIONS

The paper-recycling and papermaking industries will benefit greatly from the elimination of the "stickies" problem in its operations. Industrial adoption of this new technology has the potential for higher efficiency and lower capital and energy costs.

New Adhesives Will Remove the Problem of "Stickies"

Novel pressure sensitive adhesives will eliminate the problem of "stickies" from paper recycling operations. Although present pressure sensitive adhesives have many applications, they are often deposited as stickies on machinery and paper when recycled paper is used as feedstock to produce new paper and paperboard. An adhesive that could be easily controlled and not form stickies would save the industry \$600 million annually, which is the estimated cost for paper machine downtime and loss of product from current formulations.

The new pressure sensitive adhesives are soluble in water and cationically charged and can be removed from the pulp by adsorption onto fiber and fines. Successful development of repulpable pressure sensitive adhesives will significantly improve paper recycling operations as well as paper manufacturing. Greater understanding of the colloidal properties of adhesive particles in the pulping process is also of interest to both adhesive and paper manufacturers.

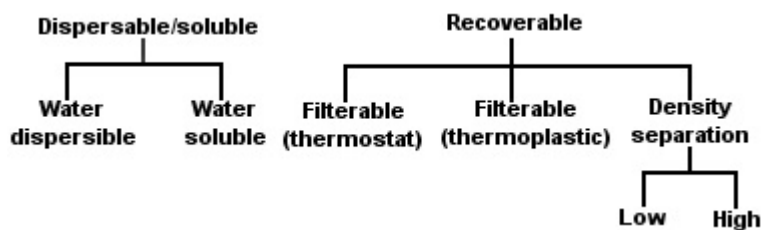


Figure 1. Researchers are evaluating technologies for new hot-melt adhesives that are either dispersible/soluble or recoverable.



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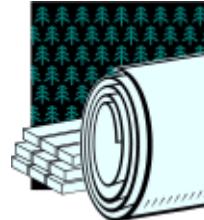
PROJECT DESCRIPTION

Goal: To develop a water-soluble pressure sensitive adhesive that has good bonding strength and high stability, will not accumulate in water, and is re-pulpable.

The objectives (and 5 tasks) of the research are to 1) synthesize and characterize water-soluble and easily removable cationic pressure sensitive adhesives; 2) optimize the pressure sensitive adhesive formulation for labels and examine its operational properties (e.g., open time, viscosity, softening and melting temperatures), and end-use properties (e.g., peel strength and shear strength); 3) study the colloidal properties and solubility of pressure sensitive adhesives in water under different conditions; this will include studies of the adsorption of colloidal or soluble pressure sensitive adhesives on fiber surfaces; 4) study the repulpability of novel pressure sensitive adhesives under laboratory conditions, and optimize the repulping conditions; and 5) study the effects of water soluble adhesives on the fiber and paper properties (strength and sizing).

PROGRESS & MILESTONES

- Cationic pressure sensitive adhesives have been successfully synthesized at the Institute of Paper Science and Technology (IPST).
- The effect of cationic contents on the end-use properties of adhesives have been studied
- Cationic content can improve the solubility of adhesives in water: the adhesives that have a cationic content of >10 percent can be fully water soluble.
- >95 percent of soluble adhesives can adsorb onto the fiber surface and be removed from the paper machine.



PROJECT PARTNERS

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October 1998